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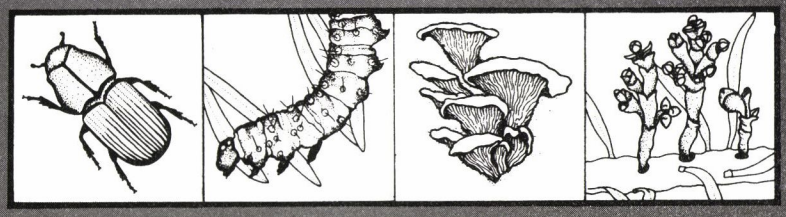

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Report 85-10 April 1985

DOUGLAS-FIR TUSSOCK MOTH POPULATION SURVEYS NORTHERN IDAHO AND WESTERN MONTANA - 1983 AND 1984

by

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INTRODUCTION

Douglas-fir tussock moth[4] populations were again surveyed in 1983 and 1984 to assess population trends. This monitoring was a continuation of the cooperative effort initiated in 1980 by the USDA Forest Service, and the States of Idaho, and Montana. Moth trapping was intensified in 1983 over that of preceding years and then maintained at about the same level in 1984.

In addition to the routine male moth survey, larval surveys were conducted in the springs of 1983 and 1984 at those sites where 1982 and 1983 moth catches were highest.

Limited pupal case/egg mass surveys were conducted in the falls of 1983 and 1984 at locations in Idaho north of Moscow where moth catches were relatively high.

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METHODS

Identical methods for male moth trapping were used in 1983 and 1984 as were used in 1982 (Dewey et al. 1983). Except for 15 plots on the Canyon Ranger District, Clearwater National Forest (Idaho south of Moscow) all areas surveyed in 1982 were resurveyed in 1983. Those same 15 Canyon Ranger District plots, plus three plots north of Moscow and two south of Moscow, were not surveyed in 1984. An additional 30 new areas were surveyed for the first time in 1983 and one new area in 1984.

Larval sampling was conducted in the spring (June) following complete dispersal from the egg masses. In 1983 eight plots were sampled in Montana and 30 in Idaho. This sampling was repeated at eight locations in Montana and at an additional six plots in Idaho north of Moscow in 1984. Sampling was done at most trapping locations with high moth counts plus several locations where moth counts were moderate or low. Larval sampling followed the lower crown beating and midcrown sampling systems described by Mason (1979).

A pupal case/egg mass survey was conducted in the fall of 1983 at the six locations in Idaho, north of Moscow, where moth catches were greatest and again at 12 sites north of Moscow in 1984. For the 1983 survey, two trained observers meandered throughout the plot, scanning for pupal cases and eggs for 15 minutes. In 1984, one observer looked for 30 minutes at each plot.

Special attention was given to watching for visible defoliation during the 1983 and 1984 aerial detection surveys in areas with high moth catches and other areas with a tussock moth outbreak history.

RESULTS

As predicted from our adult male moth and larval surveys, no defoliation of forested areas occurred in Montana or northern Idaho in 1983 or 1984. Defoliation of single trees in yards and windbreaks was noted in or near many of the same communities as in 1982. Defoliation of about 15 Douglas-fir trees on a 2-acre homesite in Somers, Montana, was observed in 1983 and 1984, and egg masses were easily located throughout this area.

Survey plots for monitoring 1983 adult male moth populations were located at 33 areas in western Montana, 61 in Idaho north of Moscow, and 64 in Idaho south of Moscow and north of Riggins. An additional plot was added in Idaho north of Moscow during 1984, and three plots north of Moscow and two south of Moscow were dropped from the 1984 survey. Total plots surveyed have increased from 40 to 87 to 140 to 158 from 1980 to 1983, respectively. A total of 154 plots were surveyed in 1984. In general, adult moth catches were either static or increased slightly from 1982 to 1983. In 1984, moth catches declined quite substantially at most plots in western Montana. They remained at very low levels in Idaho south of Moscow, but increased at 45 of the 59 plots surveyed in Idaho north of Moscow (table 1).

Table 1.--Adult male moth catches.

IDAHO NORTH OF MOSCOW

Year	No. of plots surveyed	Total moths caught	Average per plot	Average per trap
1980	20	0	0	0
1981	31	122	3.9	0.8
1982	46	927	20.2	4.0
1982	61	1,759	28.8	5.8
1984	59	3,164	53.6	10.7

IDAHO SOUTH OF MOSCOW

Year	No. of plots surveyed	Total moths caught	Average per plot	Average per trap
1980	12	4	0.3	0.1
1981	36	415	11.5	2.3
1982	79	1,017	12.9	2.6
1983	64	166	2.6	0.5
1984	61	67	1.1	0.2

WESTERN MONTANA

Year	No. of plots surveyed	Total moths caught	Average per plot	Average per trap
1980	8	10	1.3	0.3
1981	12	1,192	99.3	19.9
1982	15	2,557	170.5	34.1
1983	33	2,940	89.1	17.8
1984	33	1,248	37.8	7.6

When trap catches at a plot averaged 25 or more moths per trap, that plot was included in the spring larval sample. In 1981 there were five plots (all in western Montana) with trap catches averaging 25 or more. In 1982, this number increased to 12 plots (10 in western Montana and 1 each at the other general areas). Thirteen plots exceeded 25 moths/trap in 1983 (8 in western Montana and 5 in Idaho north of Moscow). By 1984 only three plots in Montana had average trap catches exceeding 25 moths. Idaho south of Moscow remained at zero, while in Idaho north of Moscow, seven plots exceeded 25 moths/trap (appendix 1).

Of the eight plots sampled for larvae in 1983 in western Montana, one (Somers #1) was classified as sub-outbreak, two plots (Frenchtown T and Frenchtown J) were rated as intermediate between sub-outbreak and low, and the remaining plots were classified as having low-level populations.

In Idaho north of Moscow, 10 plots were sampled in 1983 for early instar larvae using the lower crown-beating method. All plots were classified as having low-level populations. Two additional plots were sampled for larvae by cutting midcrown branches with a telescopic pole pruner. These plots were rated as having low-level populations also.

Twenty plots were sampled for early instar larvae by lower crown beating in Idaho south of Moscow in 1983. All plots were rated as having low-level populations.

In 1984, spring larval surveys were once again conducted in western Montana plots where 1983 average moth catches exceeded 25/trap. Larval populations were classified intermediate (between low and sub-outbreak) at the Kerr Dam and Somers #1 plots, but low at all other locations. An additional six plots in Idaho north of Moscow were included in the 1984 spring larval survey. Sub-outbreak ratings were given the Long Creek and Mineral Mountain plots while population levels at the remaining plots were low. The more intensive midcrown branch sequential sampling system was applied a week later at the two sub-outbreak plots and both were rated as having light populations.

Nothing was found at three locations north of Moscow during the fall of 1983 egg mass/cocoon survey; however, a single cocoon each was detected at Charles Butte, West Fork Deep Creek, and Long Creek. Results of egg mass/cocoon sampling at 12 plots in Idaho north of Moscow in the fall of 1984 showed a substantial increase in the number of egg masses and cocoons found (table 2).

Table 2.--1984 egg mass/cocoon survey results for Idaho north of Moscow

Plot	1984 Avg. moth catch/trap	Egg masses	Cocoons
Abe's Knob	17.2	0	2 new; 2 old
Big Bear Cr.	35.4	0	8 new
Big Meadow Cr.	20.6	2 new	1 new
Coon Cr.	23.4		1 new; 2 old
Flat Cr.	30.4	1 new	4 new
Long Cr.	53.0	11 new; 1 old	15 new
Mineral Mtn.	59.0	2 new	6 new
One mile NW of Mineral Mtn.	36.4	1 new	4 new
Peterson Point	17.6	0	3 new; 1 old
Schwartz Cr.	19.4	1 old	5 new
Vassar Meadows	22.8	1 new	4 new
W. Fk. Deep Cr.	32.8	1 old	2 new

DISCUSSION AND RECOMMENDATIONS

Douglas-fir tussock moth outbreaks routinely occur within northern Idaho and/or western Montana at approximately 8- to 10-year intervals (Tunnock 1973). Locations of outbreaks have been highly variable except for the area in northern Idaho between Moscow and St. Maries, where outbreaks have been documented in 1946, 1955, 1964, and 1973. The intensity of past outbreaks has ranged from barely detectable to extremely damaging. Frequently, defoliation of yard trees, windbreaks, and other trees in urban or farmstead settings precedes widespread defoliation of forested areas by 1 or 2 years.

In 1982 and again in 1983, defoliated yard trees were reported within or near nine communities in western Montana and northern Idaho. Without the current adult and larval survey systems, we would have probably predicted an outbreak to occur in 1983, or at least 1984, based on defoliation of yard trees and the time elapsed since the last outbreak.

The declining or static average moth/trap catch since 1983 in western Montana and Idaho south of Moscow lead us to believe that a damaging outbreak is not imminent in these locations in the next few years. Perhaps the peak of this population cycle occurred in 1982 or 1983, as measured by the male moth survey (Table 1). Natural factors, such as stand composition and vigor, climate, natural enemies, etc., determine the frequency, duration, and intensity of outbreaks. It is possible that these regulating factors held moth populations below epidemic levels during this outbreak cycle.

As determined from trap catches and subsequent larval and egg mass surveys, tussock moth populations have increased continually from 1981 through 1984 in Idaho north of Moscow. The number of egg masses and cocoons found in the fall of 1984 in this locale are a cause for concern and indicate that defoliation may occur as early as 1985 or 1986. Because of the continuing potential for an outbreak to develop in this area it is recommended that:

1. An early instar sequential sample be taken again in the spring of 1985 at all plots where moth catches exceeded 25 per trap in 1984.

2. An assessment be made of the level of naturally occurring polyhedrosis virus at selected areas using techniques described by Thompson and Scott 1979.

3. An evaluation be made to determine the opportunities for using NPV against developing populations.

4. A sample be made of the large larvae in the summer of 1985 at plots classified as sub-outbreak during the early instar survey.

5. An aerial survey be conducted of all areas considered high risk for tussock moth outbreaks.

6. Male moth populations in areas of concern be monitored by continued pheromone trapping.

REFERENCES CITED

Dewey, J. E.; R. L. Livingston; and S. Kohler.
1983. Douglas-fir tussock moth adult male survey north Idaho and western Montana, 1982. USDA For. Ser., Northern Region Rept. 83-14.

Mason, R. R.
1979. How to sample larvae of the Douglas-fir tussock moth. U. S. Dept. of Agric. Hndbk. 547.

Thompson, C. G. and D. W. Cott.
1979. Production and persistence of nuclear polyhedrosis virus of the Douglas-fir tussock moth, Orgyia pseudotsugata (Lepidoptera: Lymantriidae), in the forest ecosystem. J. Invertebr. Path. 33:57-65.

Tunnock, Scott.
1973. The Douglas-fir tussock moth in the Northern Region - a cartographic history of outbreaks from 1928 to 1973. USDA For. Serv., Northern Region Rept. 73-27.

APPENDIX 1

1980–1984 Trap Catches of Adult Male Moths

WESTERN MONTANA

PLOT	LOCATION	Average DFTM/trap 1980	1981	1982	1983	1984
Albert Creek	14N, 21W, S16	0	28.4	42.6	39.2	0.2
Arlee	16N, 20W, S1	—	—	—	14.2	5.2
Big Arm	24N, 21W, S36	—	3.0	9.4	1.6	0.6
Big Fork	27N, 19W, S36	—	—	9.0	0	0.2
Blue Mountain	13N, 20W, S34	—	—	—	19.8	7.4
Butler Creek	16N, 23W, S24	0	26.2	45.2	44.6	4.2
Clear Creek	19N, 24W, S26	—	—	—	18.0	9.0
Corral Creek	15N, 22W, S36	0.6	21.2	30.2	31.2	1.4
Ferndale	27N, 19W, S32	—	—	—	0.8	0.6
Fish Creek	14N, 24W, S6	—	—	—	10.2	5.0
Foys Lake	28N, 22S, S36	—	—	—	4.2	1.8
Frenchtown F	14N, 21W, S10	0.8	3.0	33.4	13.8	1.0
Frenchtown J	14N, 21W, S22	0.6	77.8	71.4	67.8	14.0
Frenchtown T	14N, 21W, S23	—	52.4	78.4	69.4	0.8
Jette Lake	23N, 21W, S2	0	7.6	20.4	1.8	1.2
Kerr Dam	22N, 21W, S13	—	—	—	35.4	23.2
Lake Mary Ronan	25N, 22W, S23	—	—	—	0.6	0.2
Lakeside	26N, 20W, S6	—	—	—	6.8	2.0
Lolo Creek	11N, 20W, S6	—	—	—	5.0	0.6
Pattee Canyon	12N, 19W, S12	—	—	—	0.4	0.4
Petty Creek	14N, 22W, S19	—	—	—	16.8	0.6
Pistol Creek	18N, 20W, S35	—	—	—	22.8	76.6
Polson-Big Creek	22N, 19W, S21	—	—	—	4.2	1.8
Polson-Hellroaring	22N, 19W, S33	—	0	6.4	0.4	0
Polson-Lost Lake	22N, 19W, S17	—	10.0	48.2	10.6	1.2
Revias Creek	17N, 22W, S4	—	—	—	7.0	1.4
Rocky Point	23N, 20W, S4	0	3.0	9.4	8.6	0.2
Skidoo Bay	23N, 19W, S2	—	—	—	0.6	0.4
Smith Camp	25N, 20W, S8	0	27.0	52.4	8.0	3.2
Sommers #1	27N, 21W, S27	—	—	54.4	70.2	55.0
Sommers #2	27N, 20W, S26	—	—	30.0	34.0	25.4
Worden Creek	12N, 20W, S21	—	—	—	8.6	0.4

IDAHO SOUTH OF MOSCOW

PLOT	LOCATION	Average DFTM/trap 1980	1981	1982	1983	1984
NEZPERCE NF						
Slate Cr. RD						
Allison Cr.	S24, 15N, 2E	—	—	0	0	0
Christie Cr.	S6, 26N, 1E	0	2.8	13.2	14.0	2.0
Cow Cr. Saddle	S36, 26N, 1W	0	0.4	0.8	0.2	0.2
Dead Pt. Ridge	S15, 1N, 2E	—	—	0.4	0.4	0
Foot Bridge	S3, 1N, 3E	—	—	0.4	0	0
Free Use	S20, 28N, 3E	0	1.6	0.2	0	0.2
Little Slate Cr. Saddle	S33, 15N, 3E	—	—	0	0	0
Shells Lick	S6, 27N, 3E	0	0.2	0	0	0
S. Fork Cow Cr.	S17, 25N, 1W	0	2.8	0	0	4.6
Squaw Cr.	S14, 24N, 1W	—	—	5.6	4.0	0.2
Elk City RD						
Mill	S33, 29N, 8E	—	—	0.4	0	0
Mother Lode Hill	S6, 30N, 8E	—	—	0.6	0	0
Rumpus Cr.	S20, 30N, 8E	—	—	0	0.2	0
Red River RD						
Siegel Hawk	S11, 28N, 9E	—	—	0	0	0
Schooner	S11, 127N, 9E	—	—	0	0	0
Clearwater RD						
Bear Trap	S24, 29N, 3E	—	—	3.2	0	0
Blacktail	S4, 29N, 4E	—	—	0.2	0	0
Clear Cr.	S34, 31N, 5E	0	0	0	0	0
Doe Cr. Road	S22, 39N, 5E	0	0	0	0	0
Fish Cr.	S16, 29N, 3E	0	0	0	0	0
Green Cr.	S11, 30N, 4E	—	—	0.6	3.6	1.0
N. Meadow Camp	S24, 30N, 4E	—	—	5.0	0.2	0
Selway RD						
Big Tinker	S26, 32N, 5 E	0.4	3.8	2.5	0	0
Lodge Point	S13, 32N, 6E	0.2	0.4	0	0	0.2
Pine Knob	S26, 32N, 6E	0	0.2	0.2	0	0
Potato Hill	S29, 32N, 6E	0	0.4	0	0.2	0

PLOT	LOCATION	Average DFTM/trap 1980	1981	1982	1983	1984
CRAIG MOUNTAINS						
Black Pine Camp	S17, 33N, 3W	—	4.2	0	0	0
Cottonwood Butte	S33, 32N, 1W	—	0	0	0	0.2
Forest	S1, 32N, 3W	—	8.6	0	0	0
Junction	S22, 32N, 4W	—	1.8	0	0	0.2
Keuterville	S9, 31N, 1W	—	3.6	2.8	0.6	3.0
Lake Waha	S15, 33N, 4W	—	0	0.8	3.2	-
Webb Cr.	S17, 33N, 3W	—	0.4	0	0	0.4
CLEARWATER NF						
Lochsa RD						
Moosehorn	S4, 34N, 7E	—	3.6	0	0	0
Canyon Junction	S4, 34N, 7E	—	6.8	0.2	0	0
Fan Cr. Saddle	S36, 34N, 6E	—	4.2	0.6	0	0
Mystery Cr.	S20, 34N, 7E	—	1.0	0.2	0	0
Trout Cr.	S25, 34N, 6E	—	2.6	0	0	
Pierce RD						
Alder	S8, 38N, 5E	—	—	0	0	0
Bald Mtn.	S5, 37N, 5E	—	—	22.0	0.2	0
Bargamin Cr.	S23, 37N, 4E	—	9.6	3.6	0.2	0
Charmook Ridge	S21, 35N, 6E	—	—	1.4	0	0.4
Clearwater Gulch	S4, 36N, 6E	—	—	1.4	0	0
Cooper	S12, 36N, 3E	—	3.0	7.2	1.2	0
Dewey Cr.	S28, 36N, 6E	—	—	0.2	0	0
Fohl	S8, 36N, 5E	—	2.0	0.4	0	0.8
French Cr.	S26, 37N, 6E	—	—	0	0	0
Grand Pit	S6, 34N, 6E	—	—	0	0.4	0
Grangemont	S24, 37N, 3E	—	2.0	14.0	0.4	0
Mud Cr.	S34, 34N, 6E	—	—	0.2	0	0
Musselshell	S19, 35N, 6E	—	—	0	0	0
O Mill	S23, 36N, 4E	—	1.4	1.4	0	0
Pierce	S2, 36N, 5E	—	—	0	0	0
Rosebud	S16, 36N, 6E	—	—	0	0	0
Summit Landing	S36, 38N, 5E	—	—	22.0	0	0
Sylvan Saddle	S27, 34N, 6E	—	—	0.2	0	0
Canyon RD						
Angel Butte	S3, 37N, 3E	—	2.2	7.6	—	—
Beaver Cr. Divide	S23, 39N, 5E	—	—	5.2	—	—
Beaver Cr. Flume	S7, 40N, 7E	—	—	2.2	—	—
Bingo Cr.	S5, 39N, 6E	—	—	4.2	—	—
Deer Cr.	S6, 36N, 3E	—	2.0	4.4	—	—
Dent Bridge Rd.	S2, 37N, 2E	—	0.4	1.4	—	—

Clearwater NF, Canyon RD, cont.

PLOT	LOCATION	Average DFTM/trap 1980	1981	1982	1983	1984
Huckleberry Mtn.	S17, 37N, 3E	—	1.4	2.0	—	—
Johnson	S9, 37N, 3E	—	9.6	26.2	—	—
Moscow Bar Ridge	S27, 40N, 8E	—	—	8.6	—	—
Orofino	S7, 36N, 1E	—	0	0.4	—	—
Shin Point Sale	S21, 39N, 7E	—	—	10.4	—	—
Skull Cr.	S30, 41N, 9E	—	—	20.0	—	—
Swanson Cr.	S4, 39N, 7E	—	—	16.2	—	—
Tumble Cr.	S6, 38N, 7E	—	—	2.4	—	—
Wells Bench Rd.	S23, 37N, 2E	—	0	0.2	—	—
Powell RD						
Beavers Meadow Rd.	S30, 37N, 15E	—	—	0.2	0	0
Brushy Fork	S32, 38N, 16E	—	—	0.0	0	0
Doe Ridge	S31, 37N, 13E	—	—	0.8	0	0
Parachute Cr.	S20, 37N, 14E	—	—	0.2	0.2	0
Post Office Cr.	S8, 36N, 12E	—	—	0.4	0.2	0
Powell Cr.	S33, 37N, 14E	—	—	0.2	0.2	0
Saddle Camp Rd.	S4, 37N, 11E	—	—	0	0	0
Turkey Track	S14, 37N, 13E	—	—	0.2	0	0

IDAHO NORTH OF MOSCOW

PLOT	LOCATION	Average DFTM/trap 1980	1981	1982	1983	1984
Potlatch RD Placed Traps						
Big Bear Cr.	S23, 41N, 2W	—	—	0.4	13.2	13.6
Big Cr.	S8, 42N, 3W	—	—	1.0	5.4	11.4
Bronsen Meadows	S34, 41N, 1W	—	—	0.2	0.2	2.8
Corral Cr.	S25, 41N, 2W	—	—	0	0.6	5.6
Crane Point	S23, 43N, 4W	—	—	2.4	7.2	9.2
Hog Meadow	S14, 40N, 1W	—	—	0.5	1.0	19.0
Lost Wheelbarrow	S12, 42N, 4W	—	—	7.8	2.4	14.8
Three Tree Butte	S25, 43N, 3W	—	—	2.0	5.6	27.6
State of Idaho Placed Traps						
Abe's Knob	S26, 42N, 1W	—	—	—	1.6	17.2
Bald Mtn.	S26, 43N, 2W	—	—	0.2	0.4	0.6
Fairview Knob	S17, 43N, 3W	0	0	0.8	0	4.2
Benewah Point	S12, 45N, 3W	—	—	—	0	3.2
Big Bear Cr.	S18, 40N, 2W	—	0	15.4	26.2	35.4
Big Meadow Cr.	S22, 40N, 4W	—	0	5.2	5.8	20.6
Caribou Cr.	S16, 59N, 2W	0	0	0	0	—
Cedar Butte	S11, 42N, 1E	—	—	—	0	0.4
Charles Butte	S32, 44N, 3W	-0	2.0	15.8	14.6	15.0
Cherry Butte	S13, 40N, 2W	—	—	—	3.8	2.8
City of Coeur d'Alene		0	0	0.2	1.0	2.8
City of Moscow	S18, 39N, 5W	0	0	2.8	4.0	1.4
Coeur d'Alene Mtn.	S14, 49N, 3W	0	0	1.4	11.2	1.0
Coon Cr.	S30, 46N, 3W	—	—	—	3.2	23.4
Crane Pt.	S26, 43N, 4W	—	—	5.6	1.6	3.0
East Dennis	S23, 43N, 3W	0	2.0	1.6	.4	3.2
East Gold Hill	S13, 42N, 4W	0	0.2	.2	.2	6.8
East Twin Pt.	S13, 40N, 5W	—	10.0	1.4	2.2	5.4
Elk Mtn.	S7, 49N, 2W	0	0	1.6	0.4	10.4
Emerald Butte	S6, 42N, 1E	—	—	—	0	0.2
Emida Peak	S35, 44N, 2W	—	—	0.2	0	4.6
Flat Cr.	S33, 41N, 3W	0	1.2	24.4	39.0	30.4
Fortier Crk.	S22, 49N, 2W	—	—	—	0.4	5.2
Jackson Mtn.	S12, 40N, 1E	—	—	—	0	0.2
John Point	S11, 44N, 3W	—	—	—	1.8	6.4
Killarney Mtn.	S14, 49N, 2W	—	—	—	5.0	4.6
Rapid Lightning Cr.	S36, 59N, 1E	0	0	0.2	0	—
Little John Cr.	S20, 44N, 2W	—	0	1.8	2.2	8.6

State of Idaho Placed Traps, cont.

PLOT	LOCATION	Average DFTM/trap 1980	1981	1982	1983	1984
Lolo Pass	S33, 45N, 4W	0	0.4	13.4	6.8	15.2
Long Cr.	S4, 40N, 4W	0	1.4	35.2	61.0	53.0
Mica Mtn.	S15, 41N, 2W	—	0	0.6	.4	2.2
Mineral Mtn.	S20, 43N, 4W	0	5.0	21.6	39.2	59.0
Mission Mtn.	S22, 43N, 5W	0	0.6	2.0	2.8	12.2
Moses Mtn.	S18, 44N, 3W	—	—	0	0	0.4
N. Fk. Palouse R.	S22, 42N, 2W	—	—	0	0	0
North-South Ski Area	S19, 43N, 2W	—	0	0.4	0.8	3.8
One mile NW Mineral Mtn.	S31, 49N, 2W	—	—	—	—	36.4
Paradise Point	S10, 40N, 5W	0	0.6	2.0	1.4	0.8
Peterson Point	S2, 44N, 2W	0	0.4	0.2	1.2	17.6
Red Horse Mtn.	S31, 49N, 2W	—	—	—	0.8	2.2
Schwartz Cr.	S32, 41N, 2W	—	0	5.0	8.4	19.4
Sheep Cr.	S12, 43N, 5W	—	0	0.4	1.6	1.0
South Fk. Little Plummer Cr.	S10, 45N, 4W	—	—	0.8	3.0	10.8
Spring Valley Cr.	S20, 40N, 2W	0	0	0.4	5.0	4.4
Squaw Cr.	S14, 44N, 4W	—	1.0	2.0	0	15.2
Strychnine Cr.	S31, 42N, 2W	—	0	0.2	2.8	1.4
Sunset Mtn.	S32, 43N, 1W	—	—	—	0	0.4
Town of Troy	S7, 39N, 3W	-0	0	0	0.2	-
Three Miles E. of Benewah	S21, 45N, 3W	—	—	—	4.2	2.4
Three Miles E. of Charles Butte	S26, 44N, 3W	—	—	—	1.4	11.8
Vassar Meadows	S35, 41N, 2W	0	0	4.0	6.0	22.8
W. Fk. Deep Cr.	S26, 43N, 5W	—	—	—	36.4	32.8
W. Fk. Mission Cr.	S33, 43N, 5W	—	0	0.4	2.4	2.8
Windfall Pass	S16, 45N, 4W	—	—	4.8	1.4	3.8